

Contributions to Indian Malacology, No. VI. Descriptions of new land shells from the Nilgiri and Anamullay Hills, and other places in the Peninsula of India.—By W. T. BLANFORD, A. R. S. M., F. G. S.

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Of the shells described in the following pages, the greater portion were collected by Captain Beddome, Deputy Conservator of Forests, in the Madras Presidency. This is the case with all the shells from the Anamullay hills, and also the remarkable species of *Spiraculum* from the neighbourhood of Vizagapatam. The Nilgiri Hill shells were found by myself in a recent visit, and *H. intumescens* was given to me some years since by Mr. Theobald as *H. Bajadera*, Pfr. I have since collected the shell myself living at Mahableshwar.

1. SPIRACULUM BEDDOMEI, n. s.

Shell very broadly umbilicated, depressed, sub-discoidal, smooth, (?) solid, white with transverse chesnut zigzag stripes. Spire flat or sub-convex, suture deep. Whorls 5, rounded, the last cylindrical, descending gradually towards the aperture, and furnished, 7-10 millimetres behind the peristome, with a short open sutural tube, projecting forwards and upwards, not touching the penultimate whorl. Aperture diagonal, circular, peristome double, both lips continuous, the inner slightly expanded, curved back into a shallow angular sinus at the suture, the outer expanded, and inverted upon the upper and dextral margins, rising near the suture into a compressed wing, which is attached throughout on the left side to the penultimate whorl. Operculum horny, concave within, convex without, flattened near the centre, 2 or 3 outer whorls furnished with a free spiral testaceous lamelliform border.

	Millem.	Inches.
Major diameter,	27	1.12
Minor ditto,.....	23	.92
Height,	10	.4
Interior diameter of aperture, ..	8	.32

Habitat. Kimery Hills near Waltair (Vizagapatam), northern division of the Madras Presidency.

This species is of about the same size as *Sp. hispidum*, Pearson, which it closely resembles in many particulars, though differing in several essential characters. Of these perhaps the most remarkable is the forward direction of the sutural tube, which, in all the previously described species of *Spiraculum* (even if the Moulmein *Opisthoporus Fordoni*, Bens. be included), is retroverted. In several forms of *Opisthoporus*, however, the spiracle projects forward, as in the present species. The wing of *Sp. Beddomei* is much more distinct, higher and more pterocycloid than that of *Sp. hispidum*; the inner peristome, (which is deficient in the last named species), is angularly sinuate beneath the wing, but there is no approach to the deep sub-circular opening of the Indian species of *Pterocyclos*. All the specimens procured by Captain Beddome were dead and weathered, and had lost their epidermis, but the traces which remained, shewed no approach to the hispidity from which the Khasi hill shell derives its name. The operculum has even more resemblance to that of *Pterocyclos tenuilabiatus*, Metcalfe, than has that of *Sp. hispidum*.

This is the first discovery in the peninsula of India of a species of *Spiraculum*, that genus having hitherto only been met with to the east of the Bay of Bengal, in Assam and Burmah, while the sub-generic form *Opisthoporus* occurs in the Malay countries and Borneo. In a country like India, which intervenes between two great zoological provinces, the Malayan, and the Africano-Asiatic, such exceptional occurrences are natural, and instances are known not merely of out-lying species, but of genera, such as *Cataulus* and *Cyclotopsis*, peculiar to the Indian peninsula or to Ceylon, though belonging to Malayan or African families. The presence of a *Spiraculum* on the eastern coast of India, is a parallel case to the existence of *Otopoma Hinduorum*, W. Blanf. in Hattiwar. It should also be noted that the discovery of specimens of the two Burmese helices, *H. Castra*, Bens. and *H. levicula*, Bens., on the hills of Orissa, shews that some few Burmese species even have extended their range down the western side of the Bay of Bengal.

2. NANINA (ARIOPHANTA) INTUMESCENS, n. s.

Shell sinistrorse, narrowly and sub-obtectly umbilicated, globose, thin, finely, subplicately, transversely striated with obsolete decussating

sculpture, dull fulvous brown, horny, rather lighter in colour just above the periphery and around the umbilicus. Spire convexly conoid, apex very obtuse, suture scarcely impressed. Whorls $4\frac{1}{2}$, slightly convex; the last bluntly carinate, descending very little near the aperture, tumid beneath, compressed around the umbilicus. Aperture large, diagonal, truncately sub-circular; peristome white, sub-expanded, margins approaching each other, columellar margin nearly vertical, rather broadly reflexed, partly covering the umbilicus.

	Millem.	Inches.
Major diameter,	32	1.3
Minor ditto,.....	26	1.05
Axis,	22	0.9

Habitat. Mahableshwar. Western Ghats of Hindustan.

This fine species of *Ariophanta* has long been confounded with *Nanina Bajadera*, Pfr. which is, however, although a variable shell, easily distinguished. *N. Bajadera* is more globose and thicker, being at the same time more transparent, it has much stronger sculpture (and deeper sutures) and is always rounded at the periphery near the mouth, and frequently throughout, while in *N. intumescens*, the blunt angulation is persistent. *N. Bajadera* too has a fine vitreous lustre, while *intumescens* is dull, and the former shell is usually of a greenish olive colour, though varying in this character and sometimes resembling the latter. The animals also shew a difference in colour, that of *N. intumescens* is uniformly, so far as I have seen, dark cinereous, while that of *Bajadera* is much lighter, but very variable. The latter shell is found mostly on shrubs, the former on the ground, and while *intumescens* has as yet only been found at Mahableshwur, 4,500 feet above the sea, *Bajadera* (which is rare at Mahableshwur) abounds on the equally or nearly equally high hills of Singhur and Poorundhur, and along the summit of the Western Ghats at about 2,000 feet. It abounds at Khandalla at the top of the Bhore Ghat.

I have already mentioned, in a previous paper, (An. Mag. Nat. Hist. for February, 1863) that an examination of the type specimens of *N. Bajadera*, Pfr. and *N. ammonia*, Valenciennes, has shewed these two supposed species to be identical. I long doubted the distinctness of the species now described from *N. Bajadera*, but although

I have specimens of the latter from many different places, they are all easily distinguished from *N. intumescens*.

3. N. (*Hemiplecta* ?) *SISPARICA*, n. s.

Shell openly perforated, subumbilicated, depressed, rather thin, striated, white with a yellowish brown epidermis, having a rather dull oily lustre. Spire convex, apex obtuse, suture flat, linear, submarginate. Whorls 4, very flatly convex above, apical whorl marked with very fine decussated plicate striation, the last not descending distinctly, but bluntly angulate above the periphery, convex beneath. Aperture oblique, semiovally lunate, white and pearly within, the breadth exceeding the height, peristome thin, margins distant, united by a thin callus, columellar margin very oblique, and triangularly reflexed close to the perforation.

	Millem.	Inches.
Major diameter,	37	1.5
Minor ditto,.....	31	1.3
Axis,	18	.75

Habitat. Sispara ghat, Nilgiri hills, S. India, rare.

I know of no near Indian ally of this species. *N. Orobia*, Benson, from Darjeeling, which approaches it in some respects, is more globose and more solid, and has impressed sutures. The Ceylonese *N. Chenui*, however, closely resembles the species above described in form, though it is easily distinguished by its peculiar impressed sculpture. I obtained but two specimens, one of which was living, near the top of Sispara ghat. It is remarkable that so fine a shell should have escaped detection before.

The animal differs in no essential character from those of the sinistrorse *Ariophanta* section. It has a large mucus pore at the end of the foot without any lobe above, the mantle is of moderate size, the head and neck granulated, the caudal portion of the body marked by oblique parallel, impressed wrinkles, and broadly margined near the sole with a double, impressed line.

4. N. (*Macrochlamys* ?) *HEBESCENS*, n. s.

Shell scarcely perforate, inwardly depressed, yellowish or fulvous, thin, horny, dull, marked with very close microscopic impressed

oblique lines above, more polished and radiately striated below. Spire low, apex rather acute, prominent, sub-acuminate, suture deep. Whorls $5\frac{1}{2}$, rounded, the first narrow, the last much broader, very bluntly sub-angulate at the periphery, and tumid beneath. Mouth large, nearly vertical, lunately sub-ovate, breadth exceeding the height; peristome thin, straight, margins sub-distant, united by a very thin callus, columellar margin nearly vertical above, very briefly and broadly reflexed, nearly covering the perforation.

	Millem.	Inches.
Major diameter,	15	0.6
Minor,	$12\frac{1}{2}$	0.5
Axis,	$8\frac{1}{2}$	0.33

Habitat. Anamullay hills. S. India.

This species resembles the Bengal *N. subgesta*, Bs., and the Ceylonese *N. carneola*, Pfr. (as figured by Reeve) in form, but has a duller lustre and deeper sutures, resembling in the latter character some of the Ceylon *Naninæ* of the same section. The microscopic sculpture is peculiar, the impressed lines being very close, but somewhat irregular and wavy. They cause the dull appearance of the surface. An ordinary lens is insufficient to shew them: under a microscope with a $1\frac{1}{2}$ in. objective they are very distinct.

5. *N. (Macrochlamys?) Lixa*, n. s.

Shell obtectly perforate, rather depressly turbinate, very thin, fulvous, horny, dull, obliquely striated and marked with very fine and close impressed lines, also oblique, only visible under the microscope, polished beneath. Spire conical, apex acute, suture impressed. Whorls $5\frac{1}{2}$, convex, gradually increasing, the last much broader, obsoletely sub-angulate at the periphery, tumid beneath. Aperture nearly vertical, roundly lunate, breadth very little exceeding the height. Peristome thin, straight, margins sub-distant, columella nearly vertical and very briefly reflexed above, almost concealing the perforation.

	Millem.	Inches.
Major diameter,	$13\frac{1}{2}$	0.54
Minor ditto,	12	0.48
Axis,	$9\frac{1}{2}$	0.38

Habitat. Anamullay hills. E. side.

This is a shell with a similar dull greasy lustre to the last and owing it to the same cause, *viz.*, microscopic sculpture. It is a well marked species. Very possibly, however, intermediate varieties may be found connecting it with *N. hebescens*.

6. *N. (Macrochlamys) INFAUSTA*, n. s.

Shell openly perforated, convexly depressed, very thin, fulvous horny, obliquely finely striated, spire convex, apex distinct, suture scarcely impressed. Whorls 6, flattish above, gradually and regularly increasing, the last not descending, depressed, swollen beneath, obsoletely sub-angulate above the periphery. Aperture oblique, lunate, breadth exceeding the height; peristome thin, margins distant, united by a very thin callus, columellar margin vertical above, briefly and triangularly reflexed.

	Millem.	Inches.
Major diameter,	23	0.92
Minor ditto,	20	0.8
Axis,	12½	0.5

Habitat. Anamullay hills, S. India.

Three specimens of this species occur amongst Captain Beddome's Anamullay collections. The above dimensions are those of the largest and most perfect specimen. In both of the smaller specimens which measure respectively in their major and minor diameters and axis 19½, 18, 10, and 17, 15, 9 millemetres, there is more or less descent of the last whorl at the aperture, but both specimens have a stunted appearance, and irregular descent of the last whorl is very common in abnormal individuals of all forms of *Helix*.

This species has no very marked character. It is very near *N. vitrinoides*, Desh., but may be recognised by its smaller and rounder mouth, narrower last whorl and more convex form. In shape it resembles *H. monticola*, Hutton.

7. *VITRINA AURIFORMIS*, n. s.

Shell very depressed, irregularly ovate, ear-shaped, very thin, striated, polished, with a membranaceous epidermis, greenish or brownish yellow in colour, paler at the nucleus. Spire flat, suture slightly impressed. Whorls 1½. Aperture oval, occupying the whole under

part of the shell, and exposing the interior to the apex ; peristome membranaceous.

	Millem.	Inches.
Length,	13	0.52
Breadth,	8	0.32
Height,	2½	0.1

Habitat. Sispara ghat, Nilgiri hills, Southern India.

This species is very near *V. gigas*, Bens. and still more closely allied to *V. Peguensis*, Theobald, being, however, a more depressed species than either, and more open. It is also less solid than the last named species. I have not met with the animal, which may possibly differ from those of other *Vitrinæ*.

If the animal resemble those of *V. gigas* and *V. Peguensis*, the occurrence of this mollusk on the western flank of the Nilgiri Hills will be one of the most anomalous with which I am acquainted amongst the land-shells of India, since I know of no other instance of a Malayan type, unrepresented on the Himalayas, of which species occur on the hills of Southern India. A small auriform shell such as this may, however, have been easily overlooked, and the Himalayan Molluscan fauna is, probably, far from thoroughly known.*

The animal of *V. Peguensis* has been partly described by Mr. Theobald who, however, has unfortunately not mentioned the form of the mantle, the presence or absence of lobes covering the shell, nor the existence of a caudal gland, unless by the expression "caudali papilla nulla" is intended to imply its absence ; more probably Mr. Theobald's meaning is that the overhanging lobe, so conspicuous in some forms of *Nanina* is absent, the gland existing, as in *Ariophanta* &c.

This *Vitrina* is not the only south Nilgiri species. A larger membranaceous form also occurs, which requires comparison with Mr. Benson's *V. membranacea* from Ceylon.

8. ACHATINA ANAMULLICA, n. s.

Shell turrito-ovate, thin, finely striated, horny with high vitreous lustre. Spire turrited, sides convex, apex obtuse, suture impressed.

* Mr. Theobald (J. A. S. B. XXXIII. p. 244,) includes *V. gigas* in his list of Himalayan shells, but the species is found on the Khasi hills, the fauna of which differs widely from that of the Himalayas.

Whorls 8, scarcely convex, the last rounded beneath. Aperture oblique, peristome thin, columella moderately arcuate, obliquely truncated below.

	Millem.	Inches.
Length,	27	1.1
Diameter,.....	12	0.48

Aperture 10 millemetres high, $6\frac{1}{2}$ broad. Habitat. Anamullay Hills.

Intermediate in its characters between *A. Nilagarica*, Bens., and the oblong ovate, Achatina of Ceylon.

Captain Beddome's Anamullay collections comprise the following species in addition to those above described :—

- Nanina vitrinoides, Desh. var.
- N. Shiplayi, Pir.
- N. Indica, Pfr. var.
- N. Travancorica ? Bens.
- N. Basilens, Bens.
- N. ampulla, Bens.
- N. auris ? Pfr.
- Bulimus Nilagaricus, Pfr. var.
- B. physalis, Bens.
- B. sp. near B. trifasciatus, Rv., one imperfect specimen.
- Cyclophorus Jerdoni, Bens.
- C. deplanatus, Pfr.
- C. sp. near C. ravidus, Bens. (or possibly an immature *Aulopoma*.)
- C. sp. (apparently near C. Shiplayi, Pir., but finely costulated, possibly the young of an *Alyceus*.)
- Pterocyclos nanus, Bens.
- Pt. rupestris, ?! Bens.
- Paludomus, sp.
- Neritina Perrotettiana, Recleiz.

To which there only remains to be added *Cataulus recurvatus*, Pfr., to complete the list of known shells from the Anamullays. I add a few remarks upon the species above quoted.

But one specimen occurs of the shell which I am disposed to consider a variety of *Nanina vitrinoides*. It is small, measuring only $18\frac{1}{2}$ millemetres by 16 in its two diameters, and $8\frac{1}{2}$ in height. It is depressed in form, and of a greenish tinge, but appears to differ in no

essential particular from the Bengal variety. The species has not before, so far as I am aware, been found in Southern India. *N. Shipleyi*, Pfr. inhabits the eastern base of both the Anamullays and the Nilgiris; on the latter hills I have found it at the foot of the Coonoor ghat. The animal is a *Nanina*, closely resembling *N. indica*, Pfr. and *N. acuducta*, Bens., having a large mucus pore at the caudal extremity of the foot without an overhanging lobe, or with but a very rudimentary one. The mantle lobes are small, and the animal in all respects closely resembles that of the sub-genus *Ariophanta*. A solitary specimen of *N. indica* from the Anamullays is very solid and rather strongly marked, the sculpture being less regular than in the common Nilgiri form, and scarcely granulate, the last peculiarity being perhaps due to weathering, as the specimen is decorticate and somewhat bleached. It is a dwarf form, less depressed than the type, and measures 17 and 15 millem. in its two diameters, and 10 in height. The shells found on the Nilgiris vary considerably.

N. Basilens, Bens. (*H. Titanica*, Pfr.), I learn from Captain Beddome, is far from scarce in the teak forests of the Anamullays, a tract 2,000 to 3,000 ft. above the sea, where *N. ampulla*, Bens. also occurs. The range of the latter shell extends a considerable distance to the north in the Wynand district, where it was found by Dr. Jerdon, if not to the base of the Coorg hills, while *N. Basilens* does not appear to be found north of the remarkable gap in the Western Ghats at Paulghat cherry, which, traversing the very highest portion of the whole chain, divides the Nilgiris from the Anamullies, and through which the railway from Madras to Beypoor passes. Both *N. ampulla* and *N. Basilens* have only been found west of the Hills.

I have not had an opportunity of comparing the shell referred doubtfully to Mr. Benson's recently published *N. Travancorica* with the full description, and the identification is therefore unsatisfactory. The shell referred to *N. auris*, Pfr. is identical with a species found at Neddiwuttom on the Nilgiris, and corresponding closely with Reeve's figure of that *N. auris* in *Conchologica Iconica*.

The little shell which I have called *Bulimus Nilagaricus*, I was at first disposed to consider a distinct species. It is only 14 millem. in length, and base by 6 in diameter. But some specimens from the Nilgiris are no larger, and there are gradations in size from these to

the typical shells. The solitary specimen of *B. physalis* has only traces of spiral sculpture, but it appears to agree in every other respect with Mr. Benson's description.

A dwarf form of *Cyclophorus Jerdoni*, only 29 millem. in diameter and 19 high, and 2 species of *Pterocyclos*, one of them unquestionably identical with *Pt. nanus*, Bens., are also comprised in Captain Beddome's collections. The second species of *Pterocyclos* of which a single weathered specimen was found, shews no essential distinction from the Bengal *Pt. rupestris*, Bens., but it appears improbable that that form should really exist so far to the south.

Cyclophorus deplanatus, Pfr. some decorticated specimens of which were amongst the Anamullay shells, occurs abundantly on Sispara ghat, at the western extremity of the Nilgiri plateau. A small shell in Captain Beddome's collections, with more colouring than *C. ravidus*, Bens., and ornamented with zigzag transverse stripes, may possibly be a young specimen of that species, but its thin and continuous peristome recalls that of some forms of *Aulopoma*, and the possibility of its belonging to that genus is strengthened by the deficiency of the epidermis close to the peristome. As the Anamullays have already furnished a *Cataulus*, the occurrence of a species of *Aulopoma* is by no means improbable.

The *Paludomus* is perhaps a variety of the species common near Bombay. The little *Neritina Perrotettiana* was previously unknown except in the Pykara river on the Nilgiris.

We have evidently, as yet, only an instalment of the molluscan fauna of the Anamullays. None of the shells above specified are from the higher ranges. So far as they have been collected, there is, as might have been anticipated, a general identity with Nilgiri shells, but at the same time a somewhat closer approximation to the Cingalese fauna.

P. S.—The above paper was written six months ago, and would have been sent for publication in the Society's Journal at once, but that I hoped to be able to procure drawings of the shells for the purpose of illustrating it. In this, I have again been disappointed, and I am compelled to forward the descriptions of the shells by themselves.

In the meantime, however, I have received from Captain Beddome several additional shells from the Anamullay hills collected by him

during the past year. Besides several new species, the collection comprises *Helix Anax*, Bens., and a fine large *Nanina* resembling *N. Cysis*, Bens. but dextrorse, and which is very possibly a large variety of Mr. Benson's *H. Basilessa*. It occurred at a height of 7,000 feet above the sea. I append descriptions of 3 of the new species sent.

9. ACHATINA BEDDOMEI, n. s.

Shell turrito-ovate, solid, finely and closely sub-costulately striated, dark purplish brown, epidermis in parts having a tendency to assume a dirty cream colour, especially in dead specimens. Spire convex below, slightly acuminate above, apex obtuse, rather inclined to the right, suture impressed. Whorls $7\frac{1}{2}$ -8 convex, the last $\frac{2}{5}$ of the entire length, rounded at the base. Aperture nearly vertical, sub-pyriform, milky within; peristome thickened, white, outer margin rather straight, not arcuate, columella deeply curved, lined with callus, sub-obliquely and rather broadly truncated at the base.

	Millem.	Inches.
Length,	30	1.2
Diameter,	$11\frac{1}{2}$.45

Aperture 10 millem. long, 6 broad.

Habitat. Anamullay Hills, 5,000 to 7,000 feet (Beddome.)

This is a more solid form than any of the Nilgiri species, and it differs from all of them, and also from the solid Ceylonese forms, in its sub-acuminate apex. It is a well marked species.

10. ACHATINA TEXTILIS, n. s.

Shell ovate-oblong, rather solid, translucent, striated near the suture, smooth, polished, dark chesnut with close vertical and horizontal lines of a greyish yellow colour, varying in breadth and resembling the threads of an irregularly woven cloth. Spire elongated, conoidal with convex sides, apex obtuse, sutures impressed. Whorls 7, convex, the last about $\frac{2}{5}$ of the entire length, rounded beneath. Aperture vertical, truncately semioval, milky within; peristome slightly thickened, white, right margin slightly sinuate toward the base, columella deeply curved, obliquely truncated beneath, margins united by a thin callus.

	Millem.	Inches.
Length,	26	1.05
Diameter,	13	0.52

Aperture $10\frac{1}{2}$ millem. long, 7 broad.

Habitat. Anamullay Hills, 6,000 feet, (Beddome.)

This is the only indigenous Indian *Achatina* with which I am acquainted, possessing coloured markings. In form it approaches some of the Ceylon *Achatinæ*, and also an undescribed Deccan species.

11. BULIMUS TRUTTA, n. s.

Shell perforated, conically ovate, thin, finely striated, light yellowish, with two spiral rows of sub-distant chesnut spots, sub-quadratae in form, on all the whorls, and two spiral chesnut stripes, the lower sometimes very faint, upon the last whorl below the periphery. Spire conical, apex acute, sutures impressed. Whorls $5\frac{1}{2}$, convex. Aperture nearly oval, slightly oblique. Peristome thin, margins united by a thin callus, columellar margin vertical, narrowly reflexed, the reflexed portion meeting the penultimate whorl at an angle.

	Millem.	Inches.
Length,	14	.55
Diameter,.....	9	.35

Aperture 7 millem. long, $4\frac{1}{2}$ broad.

Habitat. Anamullay Hills, (Beddome.)

There is some doubt whether the shells above described be adult. They have a somewhat immature appearance, but all the specimens sent, four in number, are of precisely the same size, and the thin peristome is characteristic of the group of *Bulimus Bengalensis*, to which the present species belongs. From that species and its allies, it is easily distinguished by its short conical form.

